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## IN THE CLAIMS:

- 1. An apparatus to measure micro-forces, comprising:
- a cantilever palette including a plurality of cantilever array blocks, each

  cantilever array block including a plurality of cantilevers, each cantilever including a
  plurality of cantilever fingers surrounded by a frame with frame fingers, said
  cantilever fingers and said frame fingers forming a diffraction grating, each cantilever
  array block being configured to be responsive to a predetermined micro-force, such
  that cantilevers of said cantilever array block deflect in the presence of said

  predetermined micro-force causing said diffraction grating to diffract light and thereby
  provide visual indicia of the presence of said predetermined micro-force.
  - 2. The apparatus of claim 1 wherein said predetermined micro-force is a chemical-mechanical force created by the presence of a predetermined substance.
  - 3. The apparatus of claim 2\_wherein said predetermined micro-force is a chemical-mechanical force created by the presence of a predetermined chemical.
- 4. The apparatus of claim 1 wherein said predetermined micro-force is a chemical-mechanical force created by an antibody-antigen interaction.
  - 5. The apparatus of claim 2 wherein each cantilever array block of said plurality of cantilever array blocks is configured to be responsive to a different predetermined substance.
  - 6. The apparatus of claim 2 wherein each cantilever array block of said plurality of cantilever array blocks is configured to be responsive to a predetermined level of a single predetermined substance.
- The apparatus of claim 2 wherein said plurality of cantilever array blocks includes cantilever array block subsets, each cantilever array block subset being configured to be responsive to a different predetermined substance, and each cantilever

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array block within each cantilever array block subset being configured to be responsive to a predetermined level of said predetermined substance.

- 8. The apparatus of claim 1 wherein cantilever array blocks of said cantilever palette are configured to be responsive to a predetermined micro-force that is a thermal-mechanical micro-force arising from conduction, convection, or radiation.
  - 9. The apparatus of claim 1 wherein cantilever array blocks of said cantilever palette are configured to be responsive to a predetermined micro-force that is a magnetic micro-force.
    - 10. The apparatus of claim 1 wherein cantilever array blocks of said cantilever palette are configured to be responsive to a predetermined micro-force that is an electrostatic micro-force.
  - 11. The apparatus of claim 1 wherein cantilever array blocks of said cantilever palette are configured to be responsive to a predetermined micro-force that is a piezoelectric micro-force.
- 20 12. The apparatus of claim 1 further comprising image enhancement devices selected from the group consisting of: a beam splitter, a visible lens, and a spatial filter.
- 13. The apparatus of claim 1 further comprising a pin hole array attached to said cantilever palette.
  - 14. A method of identifying micro-forces, said method comprising the steps of:
    forming a cantilever palette including a plurality of cantilever array blocks,
    each cantilever array block including a plurality of cantilevers, each cantilever
    including a plurality of cantilever fingers surrounded by a frame with frame fingers,
    said cantilever fingers and said frame fingers forming a diffraction grating, each

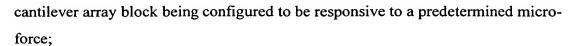
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exposing said cantilever palette to said predetermined micro-force, thereby causing cantilevers of said cantilever array block to deflect such that said diffraction grating produces diffracted light; and

visually observing said diffracted light from said diffraction grating to identify the presence of said predetermined micro-force.

- 15. The method of claim 14 wherein said forming step includes the step of forming said cantilever palette to be responsive to a predetermined micro-force that is a chemical-mechanical force created by the presence of a predetermined substance.
  - 16. The method of claim 15 wherein said forming step includes the step of forming each cantilever array block of said plurality of cantilever array blocks to be responsive to a different predetermined substance.
  - 17. The method of claim 15 wherein said forming step includes the step of forming each cantilever array block of said plurality of cantilever array blocks to be responsive to a predetermined level of a single predetermined substance.
  - 18. The method of claim 15 wherein said forming step includes the step of forming cantilever array block subsets, each cantilever array block subset being configured to be responsive to a different predetermined substance, and each cantilever array block within each cantilever array block subset being configured to be responsive to a predetermined level of said predetermined substance.
  - 19. The method of claim 14 wherein said forming step includes the step of forming said cantilever palette to be responsive to a predetermined micro-force that is a thermal micro-force.

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- 20. The method of claim 14 wherein said forming step includes the step of forming said cantilever palette to be responsive to a predetermined micro-force that is a magnetic micro-force.
- 5 21. The method of claim 14 wherein said forming step includes the step of forming said cantilever palette to be responsive to a predetermined micro-force that is an electrostatic micro-force.